

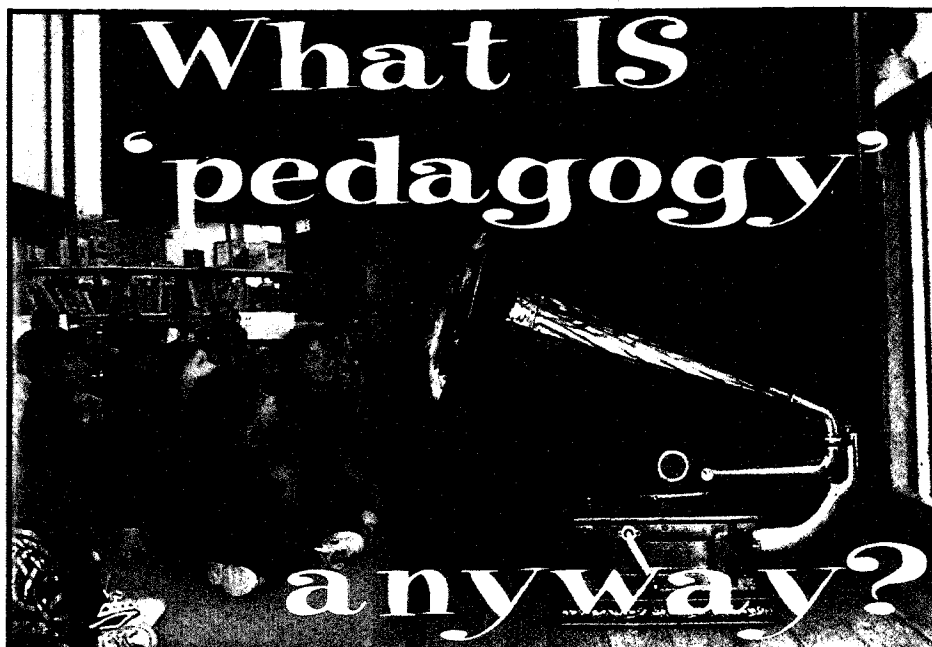
COMMONWEALTH OF AUSTRALIA

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Tracey Smith and Tom Lowrie explain how pedagogy can be a useful way of describing the relationships between teaching, learning and assessing in classrooms.

In education circles, many words are brought into conversations that seem new and even unnecessary. The word pedagogy has crept into the discourse of many educators in recent times. Typically, new words enter into a conversation as a result of an inquiry into some facet of education. When inquirers (including teachers as researchers) are reporting their findings, they often seek a language that is explanatory, including words that will encompass a number of ideas.

In many ways, words are our only way of making sense of our practice, as well as being able to share our understandings in conversations with each other. This journal is an example of how we can put our practice into words (and pictures) so that ideas may be shared with others. Pedagogy is one such word that takes in a number of ideas by its very nature.

This article seeks to explore the conversational nature of the word pedagogy and the implications this would have for classroom learners of mathematics.

What is pedagogy anyway?

Essentially, and most importantly, the word pedagogy refers to our relationships with children. More explicitly, it refers to 'appropriate ways of teaching and giving assistance to children and young people' (van Manen, 1999). To talk of

pedagogy is to talk of the appropriate ways we interact with each other as teachers and learners.

Our relationships with a child (*paides*) or children highlight the non-cognitive dimensions of teaching and learning that are often overlooked in education. The relational, emotional, moral and personal dimensions of the teaching/learning process are an integral part of the notion of pedagogy. van Manen (2002) calls these the 'pathic dimensions of pedagogy', and suggests that the act of teaching depends on the teacher's personal presence, perceptiveness, thoughtfulness and tact for knowing what to say and do in classroom situations. It could be argued that these affective dimensions play a crucial role in our interactions with students as we learn mathematics. Any description of effective teaching and learning must consider affective factors as well as cognitive and social factors that influence learning outcomes.

The Queensland School Reform Longitudinal Study (Education Queensland 2002) described four 'productive pedagogies' that were evident in 'exemplary' classrooms studied over a two-year period. The 'productive pedagogies' encompass appropriate and effective ways of interacting with each other in classrooms. The four pedagogies describe classroom practices that focus on, and enhance: intellectual quality (higher-order thinking and deep understanding), connectedness (with learning inside school and with meaningful contexts outside school), a supportive environment (enhances student centred and engaged learning), and recognition of difference (acknowledges cultural diversity and the need for inclusive practices that lead to a sense of citizenship).

However, what is noticeably missing from these pedagogies is any explicit reference to how we assess student learning in classrooms.

Placing assessment in the picture

By thinking of the word pedagogy in relational terms, we can move forward to thinking of pedagogy as teaching and learning in relationship. If it is true that teaching occurs only to the extent that learning occurs, then the relationship between the two terms becomes reciprocal. How then does a teacher determine if learning is occurring in appropriate ways within a classroom? Surely, any

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pedagogy that is productive needs to keep track of the extent to which effective learning occurs. For us, the answer lies in the way we, as teachers, plan for the assessment of learning. We see the assessment process as an integral component of any pedagogical relationship. We agree with Clarke (1997) when he reminds us that as educators we reflect what we believe is most important by what and how we choose to assess learning. In this sense, assessment becomes a mediating process between teaching and learning. The word assessment is drawn from the Latin *assidere* (to sit beside). In this sense, assessment

becomes a participatory event 'shared with' learners throughout the learning process, rather than something that is 'done to' learners during separate events. One way of thinking about assessing students is to think of creating conversations with them to find out what they know, understand and can do.

Pedagogy as conversation

If we view the processes of teaching, learning and assessing as being in a reciprocal relationship, then the term pedagogy becomes an inclusive term that encompasses all three processes. In a pedagogical relationship, teaching cannot be a separate event to learning, and learning cannot be a separate event to assessing student progress. In our view, any reference to pedagogy that does not account for the processes we undertake to assess student learning would be like a two-legged stool – unbalanced, and on pedagogically shaky ground. So, what could a pedagogical relationship look like in a mathematics classroom? We have come to think that the educative relationships occurring in classrooms can be characterised in terms of pedagogy as conversation.

The term 'pedagogy' in pedagogy as conversation embodies the reciprocal relationship between the

three educative processes of teaching, learning and assessing. In this sense, 'pedagogy' recognises that the holistic and relational nature of 'coming to know' exists within the three synergistic processes of teaching, learning and assessing. The term 'conversation' refers to both written and oral interactions within a community of learners. A conversation suggests talk among friends where understanding emerges as a joint construction by participants who are seeking a deeper, shared understanding of the issue at hand. Conversation suggests a shared commitment to listening and learning from each other. On the other hand, a discussion traditionally refers to individuals putting forward their own point of view without necessarily seeking a shared understanding. An important characteristic of conversations is their open-ended nature that allows for unexpected revelations and destinations. Pedagogy as conversation requires a reflective and open approach towards learning so that learning can be shared conversationally in written and oral forms to strengthen caring relationships in the classroom.

Creating classroom conversation

Pedagogical practices that promote conversations in classrooms provide opportunities for verbalising, clarifying and recording thinking as students make sense of their learning (Smith 2000). The use of content specific open-ended tasks (Sullivan 1999) can create classroom conversations that require students to think, reflect and communicate mathematically in a way that makes sense to them personally. Creating conversations can help teachers to guide students' thinking in a supportive classroom environment. A supportive environment acknowledges the affective domain of learning, and highlights the importance of positive attitudes, risk taking, sharing the purpose of learning experiences, motivation, and viewing mistakes as opportunities for learning. As teachers we need to plan for purposeful conversations that will create more audible and visible representations of thinking.

Outer conversations

Initially, we need to promote conversations that 'bring thinking out' where the emphasis is on communicating meaning through oral conversations in a variety of classroom settings. Such oral talk can be thought of as *outer conversations* and could take the form of whole class talks using strategies such as class concept maps to establish a shared vocabulary, and teacher questioning to begin conversations and elicit prior knowledge. An example of teacher questioning could be 'Tell me what you know about ...'. Outer conversations focus on eliciting and modelling the natural language used by students to

explain concepts. This promotes rehearsal and practice of language that in turn can be used to assist students to produce written conversations. The researchers involved in developing the productive pedagogies (Education Queensland, 2002) refer to this as 'metalinguage' which is an important aspect of developing intellectual quality.

Inner conversations

Another form of classroom conversation takes on a more metacognitive nature where students begin to take ownership of their own learning by reflecting on, and monitoring their own progress, or thinking about their own ways of knowing. This focus can be thought of as *inner conversations* with the self that become part of outer conversations as students share their inner talk in more collaborative and social conversations. Opportunities for creating inner conversations include:

- think/pair/share activities where students initially talk 'inside their heads', then share their thoughts with a partner, and possibly share again in small group or class conversations;
- student-developed concept maps that reflect their own understanding of the topic language and the connections with other ideas;
- teacher and student modelling of 'think aloud' strategies and solutions; and
- revisiting work samples to clarify and reflect on progress, leading to self-correction and self-assessment.

All of these strategies can become powerful learning tools for students. By articulating their inner talk in more collaborative conversations,

students often self-correct themselves as they explain and monitor their solutions. In this way, mistakes become sites for meaningful learning.

Written conversations

Written representations of thinking elicit another type of conversation. Written conversations occur as students record their solutions and responses to tasks that can further develop the metacognitive processes (inner conversations) of reflection and verification of solutions. As younger learners (students) record their thinking and solutions to tasks, they provide an opportunity for older learners (teachers) to share their 'inner talk' so teachers can provide more focused written and oral feedback, or 'outer talk'.

Two examples are now offered to illustrate the notion of pedagogy as conversation. Both work samples demonstrate how written conversations that emerged from authentic classroom work can become assessment opportunities.

Figure 1 represents a work sample collected towards the end of a unit of work in a Year 6 classroom, designed to integrate all the concepts that had been explored during a unit on volume. Lisa's work sample highlights how student thinking can be elicited simply by asking them to write about their design for a container that will hold three litres of milk and still fit in a refrigerator. In this Year 6 classroom, assessment criteria were shared with the students so that they knew the teacher was looking for evidence of the relationship between volume and capacity as well as an explanation that was presented in an organised way to show thinking and reasoning. This work sample shows how the conversation nature of learning can be an enlightening and empowering experience for all learners in a mathematics classroom, especially if the criteria are shared to give a sense of purpose to the task. The open-ended nature of the task also allowed for creative thinking and a connectedness (Education Queensland 2002) to Science and Technology and to a real life situation which gave relevance and meaning to the unit on volume. Although the solution was not exactly correct, Lisa acknowledged this in her work and justified her design.

A second example of pedagogy as conversation is illustrated through one student's response to an open-ended task in a Year 2 classroom. This time the open-ended task was used at the beginning of a unit of work to find out about students' prior knowledge and misconceptions. Figure 2 represents a work sample taken at the beginning of a unit of work on measurement. The open-ended task was designed to determine students' conceptual understanding of the metre ruler and therefore establish prior

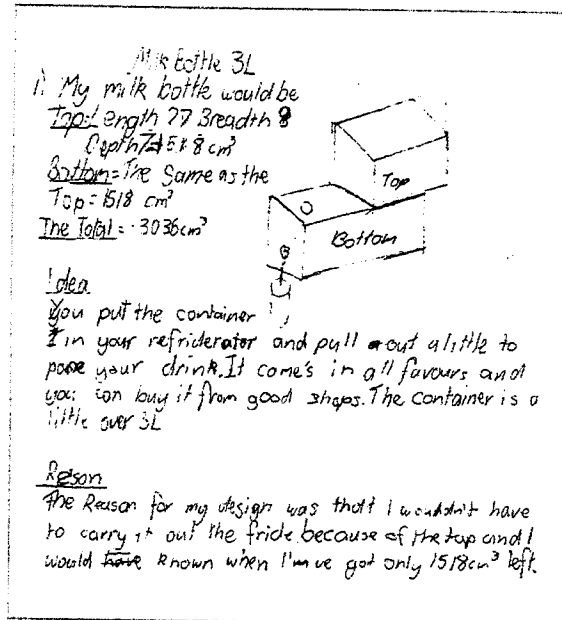


Figure 1. Lisa's design for a 3 litre milk container

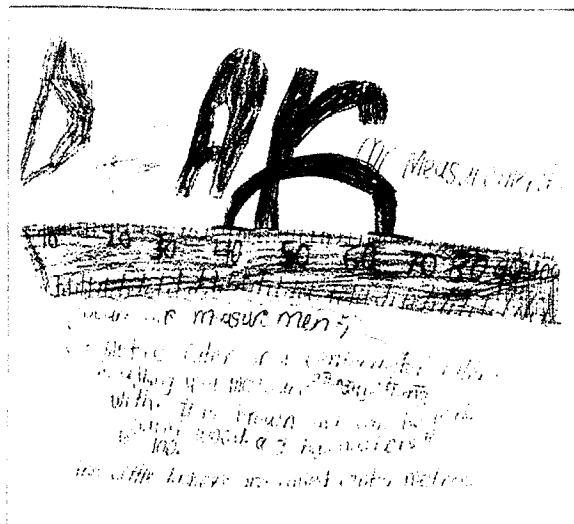


Figure 2. Annabel's explanation of a metre ruler

knowledge and direct further learning. The children were told that Mr Measurement (a personal friend) had lost his memory and was highly embarrassed that he could not remember what a metre ruler looked like. The students were asked to draw a picture of a metre ruler and explain everything they could about the ruler to help Mr Measurement with his memory. This work sample clearly showed many understandings about the metre ruler, but also gave direction for further learning.

The use of an open-ended task led to shared solutions and explanations and an in-depth conversation about how to represent centimetres accurately on the ruler. During this sharing time, one student, as he shared his drawing, told the class that he had made a mistake because he 'put ten dashes in between each section instead of nine'.

The practice of sharing solutions can create outer conversations that allow for students to share their inner conversations that often lead to self-assessment or self-correction. The idea of written conversations can lead to the use of portfolios to show evidence of students' improvement over time. Open-ended tasks can produce a learning dialogue between students and teachers that can be used for both teacher assessment, and student self-assessment.

Pedagogy as conversation has an underlying assumption embedded within it. The term reinforces the notion that teachers are co-learners and models for learning. Likewise, pedagogy as conversation allows the student to become the teacher, and the teacher to become the learner during modelling conversations where students and teachers model solutions and strategies with the class.

As teachers, if we think of our relationship with learners as opportunities for developing inner outer and written conversations, then the relationship

with assessment becomes clearer. Learning opportunities that make thinking audible (outer conversations), foster metacognitive processes (inner conversations) and create work samples (written conversations) show how conversations can become assessment opportunities.

In summary, we have suggested a new way of thinking about pedagogy as creating opportunities for constructive and enlightening conversations. A shift in thinking towards seeing the pedagogy of mathematics as a series of oral and written conversations creates opportunities for developing a shared language (discourse) of mathematics through outer conversations. It also creates possibilities for personally exploring and clarifying new information through inner conversations with the self, and developing the skills of written conversations so that growth in learning can be evidenced, and purposeful feedback can be provided. Written conversations such as the three-litre milk container design and the letter to Mr Measurement provided a context for both teachers and students to learn from their experiences and from each other. Perhaps our written conversation has resonated in some way with your thinking about learning.

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